FCC/ISED RF Test Report

Report No.:	FCC_IC_SL19110601-TCG-001 _300MHz Rev 1.0
FCC ID:	HBW9545
IC:	2666A-9545
Test Model:	MYQ-G0401
Series Model:	MYQG0401-E, 821LMC
Received Date:	12/20/2019
Test Date:	12/23/2019 - 02/06/2020
Issued Date:	02/06/2020
Applicant:	Chamberlain Group, Inc
Address:	300 Windsor Drive, Oakbrook, IL 60523
Manufacturer:	Jabil, Inc.
Address:	Jabil Circuit India Pvt. Ltd. B -26, MIDC Industrial Area, Ranjangaon Taluka Shirur, Pune - 412220, Maharashtra, India
Issued By:	Bureau Veritas Consumer Products Services, Inc.
Lab Address:	775 Montague Expressway, Milpitas, CA 95035
FCC/IC Registration / Designation Number:	540430 / 4842D

ACCREDITED
TESTING CERT # 2742-01

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
FCC_IC_RF_SL19110601-TCG001 _300MHz	Orignal Release	01/31/2020
FCC_IC_SL19110601-TCG-001 _300MHz Rev 1.0	Revised	02/06/2020

1 Certificate of Conformity

Product:	Smart Garage Control – C-Hub
Brand:	Chamberlain
Test Model:	MYQ-G0401
Sample Status:	Engineering Sample
Applicant:	Chamberlain Group, Inc
Test Date:	12/23/2019 - 02/06/2020
Standards:	FCC Part 15, Subpart C (15.231) RSS-210 Issue 10, RSS-GEN Issue 5 ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc., Milpitas Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** **02/06/2020**

Yao-Wei Lee / Test Engineer

Approved by : _____ , **Date:** **02/06/2020**

Shuo Zhang / Engineer Reviewer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.231)/ISED RSS-210				
FCC Clause	RSS Section(s)	Test Item	Result	Remarks
15.207	RSS-Gen[8.8]	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.205 &15.209 & 15.231(b)	RSS-Gen[8.9] RSS-210[A.1.1]	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit.
15.231(b)	RSS-210 [A.1.2]	Field Strength of Fundamental Signal	PASS	Meet the requirement of limit
15.231(c)	RSS-210 [A.1.3]	20dB Bandwidth & 99% Bandwidth Measurement	PASS	Meet the requirement of limit.
15.231(a)(1)	15.231(a)(1)	15.231(a)(1)	PASS	15.231(a)(1)
15.203		Antenna Requirement	PASS	Antenna is permanently attached

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.51dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.73dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.64dB
	6GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	4.91dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smart Garage Control – C-Hub
Brand	Chamberlain
Test Model	MYQ-G0401
Series Model	MYQ-G0401-E, 821LMC
Identification No. of EUT	446195020226
Power Supply Rating	5.0VDC @ 1.5A
Modulation Type	FSK
Modulation Technology	PASS
Transfer Rate	256kbps
Operating Frequency	310 MHz, 315 MHz, 390 MHz
Number of Channel	3
Antenna Type	Monopole (wire), 5.19dBi gain
Antenna Connector	N/A

3.2 Description of Test Modes

Channel	Freq. (MHz)
1	310
2	315
3	390

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	-	-

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
APCM: Antenna Port Conducted Measurement

NOTE: "-" means no effect.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (kbps)
1 to 3	1,2,3	OOK	256

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (kbps)
1 to 3	1,2,3	OOK	256

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	DATA RATE (Mbps)
1 to 3	3	OOK	256

Antenna Port Conducted Measurement:

☐ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Yao Wei Lee
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Yao Wei Lee
PLC	25deg. C, 65%RH	120Vac, 60Hz	Yao Wei Lee
APCM	N/A	N/A	N/A

3.3 Description of Support Units

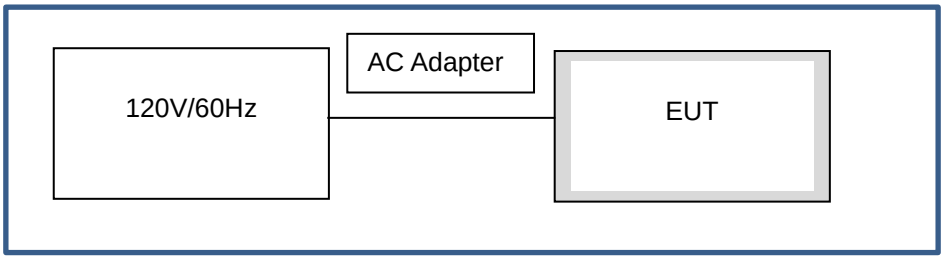
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Dell	Latitude 3550	2MHWY32	N/A	Provided by Lab
B.	AC Adapter	QQJQ Power Supply	A912-050150W-US1	N/A	N/A	To Power Up EUT

Note: The core(s) is (are) originally attached to the cable(s).

3.3.1 Configuration of System under Test

Test Chamber



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.231)
RSS-210 Issue 10
RSS-GEN Issue 5
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Fundamental and Spurious Emission

4.1.1 Limits of Fundamental and Spurious Emission

FCC §15.205, §15.209, §15.231 (b)

According to FCC §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Frequencies (MHz)	Field Strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meters)
40.66 ~ 40.70	2250	225
70 ~ 130	1250	125
130 ~ 174	1250 to 3750 **	125 to 375 **
174 ~ 260	3750	375
260 ~ 470	3750 to 12500 **	375 to 1250**
Above 470	12500	1250

Note: ** means Linear interpolations
(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
PXA Signal Analyzer KEYSIGHT	N9030B	MY57140584	03/05/2019	03/05/2020
Horn Antenna ETS-Lindgren	3117	218554	11/06/2019	11/06/2020
Biconilog Antenna Sunol	JB1	A030702	03/09/2018	03/09/2020
Preamplifier RF BAY INC	LPA-6-30	11170601	04/27/2019	04/27/2020

NOTE:

1. The horn antenna and HP preamplifier (model: 3117) are used only for the measurement of emission frequency above 1GHz if tested.

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3-meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

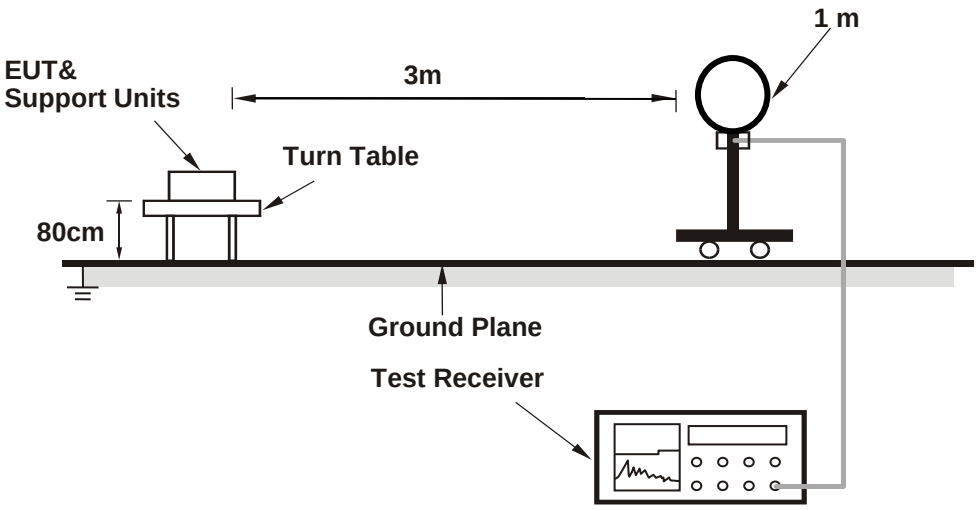
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

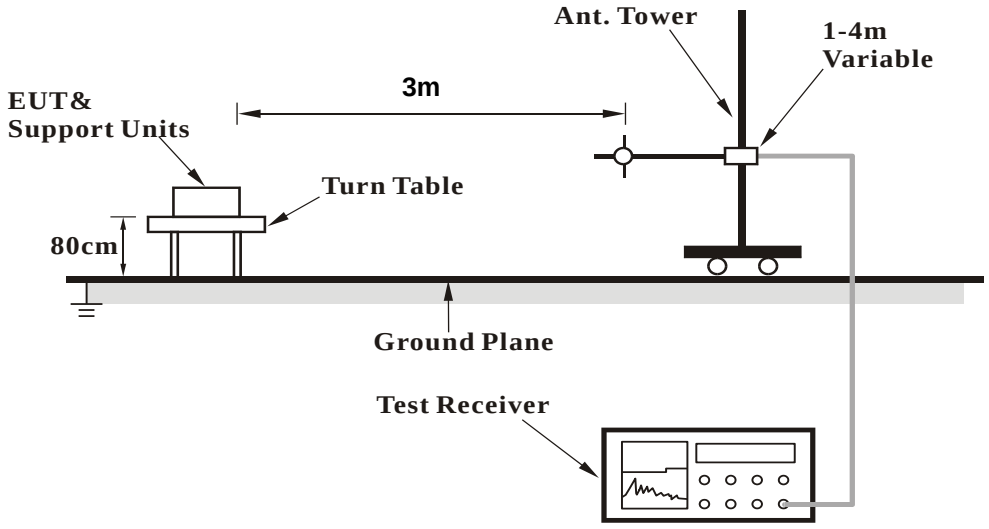
No deviation.

4.1.5 Test Setup

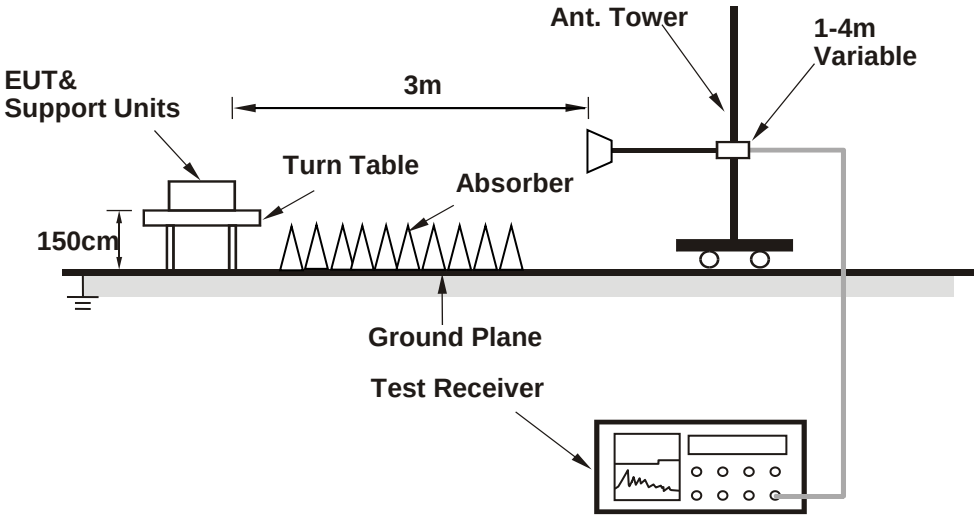
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



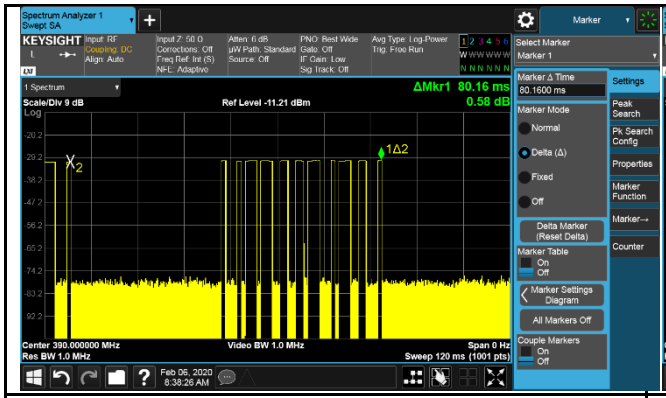
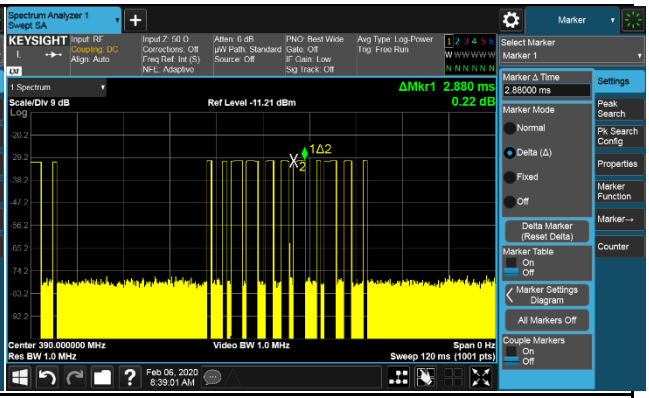
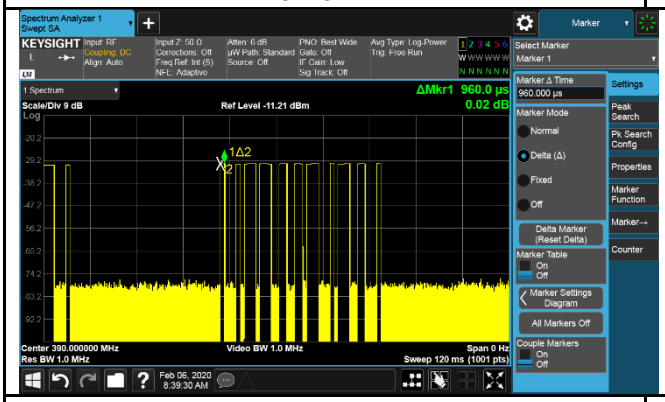
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

a. EUT is powered by a DC adapter and doesn't have to be connected to Notebook Computer while being tested.

4.1.7 Test Results

Correction Factor Measurement Result:

<table>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Duty Cycle 1#</td><td>Duty Cycle 2#</td></tr>
<tr><td> 
</td><td>Wide Pulse: 2.88ms
Narrow Pulse: 0.96ms
Duty cycle= (2.88*7+0.96*4)/80.16 =29.94%
Average Duty Factor: 20*log (Duty Cycle) = -10.47dB</td></tr>
<tr><td>Duty Cycle 3#</td><td></td></tr>
</table>

Declared by manufacturer

Our Billion Code consists of a sync pulse (1msec), 10 trinary numbers (4msec each), blank time (39msec each), synch pulse (3msec), 10 trinary numbers (4msec each) & blank time (37 msec). Looking at a worst-case coding scheme, the worst case ON time over 100msec is 46 msec.

20 log (46/100) = -6.74dB.

EMISSION WORST-CASE DATA:

Freq (MHz)	Reading (dBuV/m)	Angle (Deg)	Height (m)	Polar H/V	Factors (dB)	CF	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
626	32.6	261	184	H	26.3	-	58.9	82	23.1	Peak
626	-	-	-	H	-	-6.74	52.16	62	9.84	Average
626	32.4	217	178	V	26.4	-	58.8	82	23.2	Peak
626	-	-	-	V	-	-6.74	52.06	62	9.94	Average
630	31.4	69	199	H	26.4	-	57.8	82	24.2	Peak
630	-	-	-	H	-	-6.74	51.06	62	10.94	Average
630	32.9	34	205	V	26.4	-	59.3	82	22.7	Peak
630		-	-	V	-	-6.74	52.56	62	9.44	Average
780	39.28	204	180	H	28.3	-	67.58	82	14.42	Peak
780	-	-	-	H	-	-6.74	60.84	62	1.16	Average
780	39.1	180	190	V	28.4	-	67.5	82	14.5	Peak
780	-	-	-	V	-	-6.74	60.76	62	1.24	Average
939	36.3	216	189	H	30.6	-	66.9	82	15.1	Peak
939	-	-	-	H	-	-6.74	60.16	62	1.84	Average
939	35.8	231	194	V	30.5	-	66.3	82	15.7	Peak
939	-	-	-	V	-	-6.74	59.56	62	2.44	Average
945	37.2	160	175	H	30.4	-	67.6	82	14.4	Peak
945	-	-	-	H	-	-6.74	60.86	62	1.14	Average
945	36.8	172	184	V	30.6	-	67.4	82	14.6	Peak
945	-	-	-	V	-	-6.74	60.66	62	1.34	Average
1170	83.2	220	193	H	-15.4	-	67.8	82	14.2	Peak
1170	-	-	-	H	-	-6.74	61.06	62	0.94	Average
1170	81.2	236	179	V	-15.6	-	65.6	82	16.4	Peak
1170	-	-	-	V	-	-6.74	58.86	62	3.14	Average

REMARKS:

1. Peak Emission level (dBuV/m) = Reading Value (dBuV) + Factors(dB)
2. Average Emission level (dBuV/m) = Peak Emission level (dBuV/m) + Correction Factor (CF)
3. Frequency range is up to 4GHz.
4. The emission levels of other frequencies were less than 20dB margin against the limit.
5. Margin value = Emission level – Limit value.

Field Strength of Fundamental Signal

Freq (MHz)	Reading (dBuV/m)	Angle (Deg)	Height (m)	Polar H/V	Factors (dB)	CF	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
313	55.75	113	162	H	20.2	-	75.95	95	19.05	Peak
313	-	-	-	H	-	-6.47	69.48	75	5.52	Average
313	54.54	222	178	V	20.1	-	74.64	95	20.36	Peak
313	-	-	-	V	-	-6.47	68.17	75	6.83	Average
315	56.83	96	191	H	20.2	-	77.03	95	17.97	Peak
315	-	-	-	H	-	-6.47	70.56	75	4.44	Average
315	57.08	64	194	V	20.2	-	77.28	95	17.72	Peak
315		-	-	V	-	-6.47	70.81	75	4.19	Average
390	55.41	256	175	H	22.3	-	77.71	99	21.29	Peak
390	-	-	-	H	-	-6.47	71.24	79	7.76	Average
390	56.46	263	182	V	22.3	-	78.76	99	20.24	Peak
390	-	-	-	V	-	-6.47	72.29	79	6.71	Average

REMARKS:

1. Peak Emission level (dBuV/m) = Reading Value (dBuV) + Factors(dB)
2. Average Emission level (dBuV/m) = Peak Emission level (dBuV/m) + Correction Factor (CF)
3. Frequency range is up to 4GHz.
4. The emission levels of other frequencies were less than 20dB margin against the limit.
5. Margin value = Emission level – Limit value.

4.2 Conducted Emissions Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
EMI Test Receiver ROHDE & SCHWARZ	ESIB 40	100179	08/28/2018	08/28/2020
Transient Limiter ELECTRO-METRICS	EM-7600-5	106	07/30/2019	07/30/2020
LISN EMCO	3816/2NM	214372	01/14/2020	01/14/2021

4.2.3 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

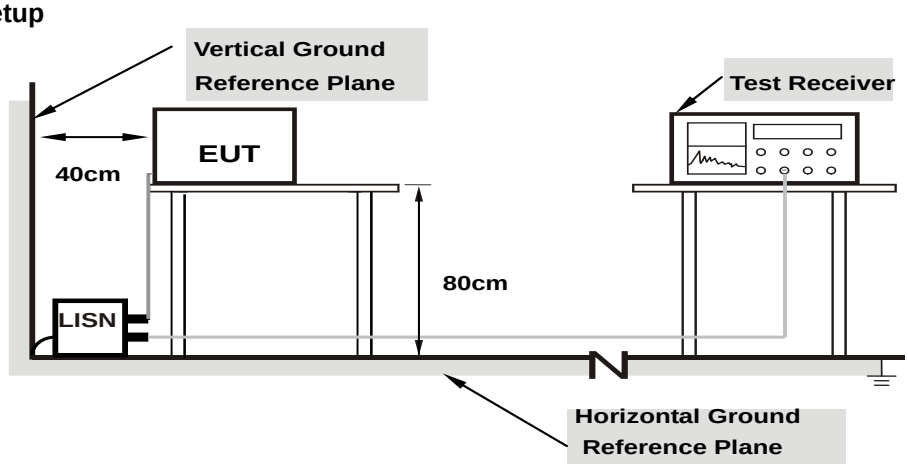
c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

a. EUT is powered by connecting an AC power source.

b. Controlling software has been activated to set the EUT on specific status.

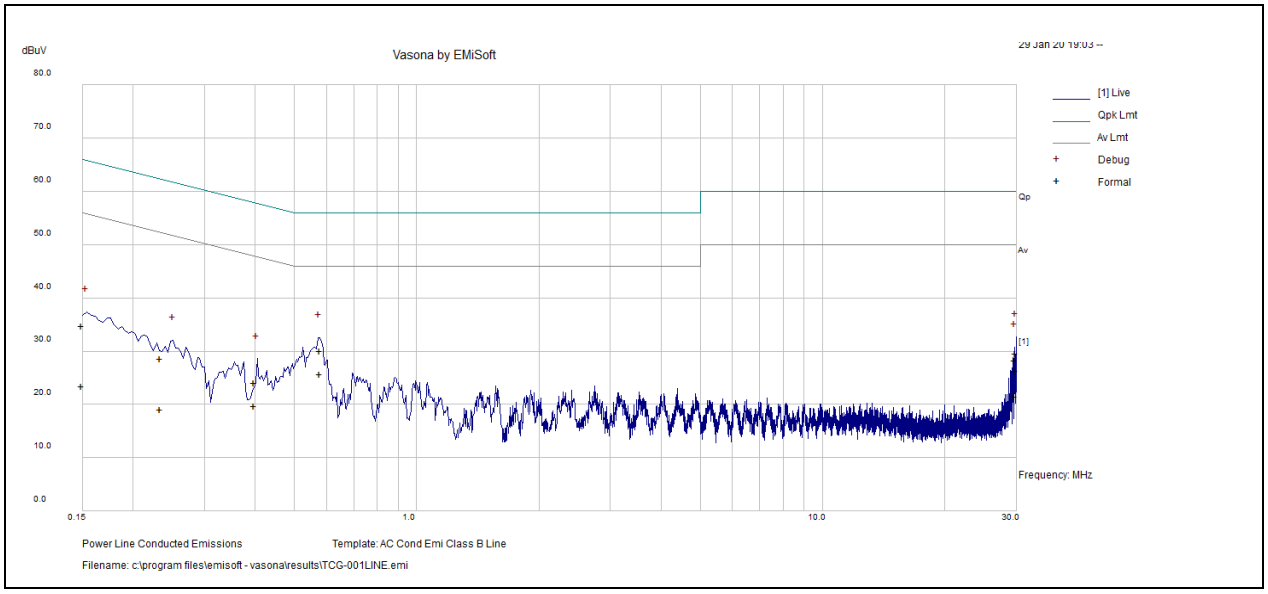
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak / Average

No	Frequency (MHz)	Reading Value (dBuV)	Cable Loss (dB)	Insertion Loss (dB)	Emission Level Corrected (dBuV)	Measurement Type	Line/ Neutral	Limit (dBuV)	Margin (dB)	Pass/ Fail
1	0.578141	20.55	9.46	0.04	30.04	Quasi Peak	Live	56	-25.96	Pass
2	29.9978	18.98	9.95	0.66	29.59	Quasi Peak	Live	60	-30.41	Pass
3	0.15	25.43	9.29	0.04	34.76	Quasi Peak	Live	66	-31.24	Pass
4	0.397756	14.54	9.44	0.04	24.02	Quasi Peak	Live	57.9	-33.88	Pass
5	29.78703	17.66	9.95	0.66	28.26	Quasi Peak	Live	60	-31.74	Pass
6	0.233976	19.11	9.41	0.04	28.57	Quasi Peak	Live	62.31	-33.74	Pass
7	0.578141	16.17	9.46	0.04	25.66	Average	Live	46	-20.34	Pass
8	29.9978	15.79	9.95	0.66	26.4	Average	Live	50	-23.6	Pass
9	0.15	14.05	9.29	0.04	23.38	Average	Live	56	-32.62	Pass
10	0.397756	10.3	9.44	0.04	19.78	Average	Live	47.9	-28.12	Pass
11	29.78703	10.82	9.95	0.66	21.43	Average	Live	50	-28.57	Pass
12	0.233976	9.57	9.41	0.04	19.03	Average	Live	52.31	-33.28	Pass

REMARKS:

1. The emission levels of other frequencies were very low against the limit.
2. Margin value = Emission level - Limit value
3. Emission Level = Correction Factor + Raw Value + Factors Value.

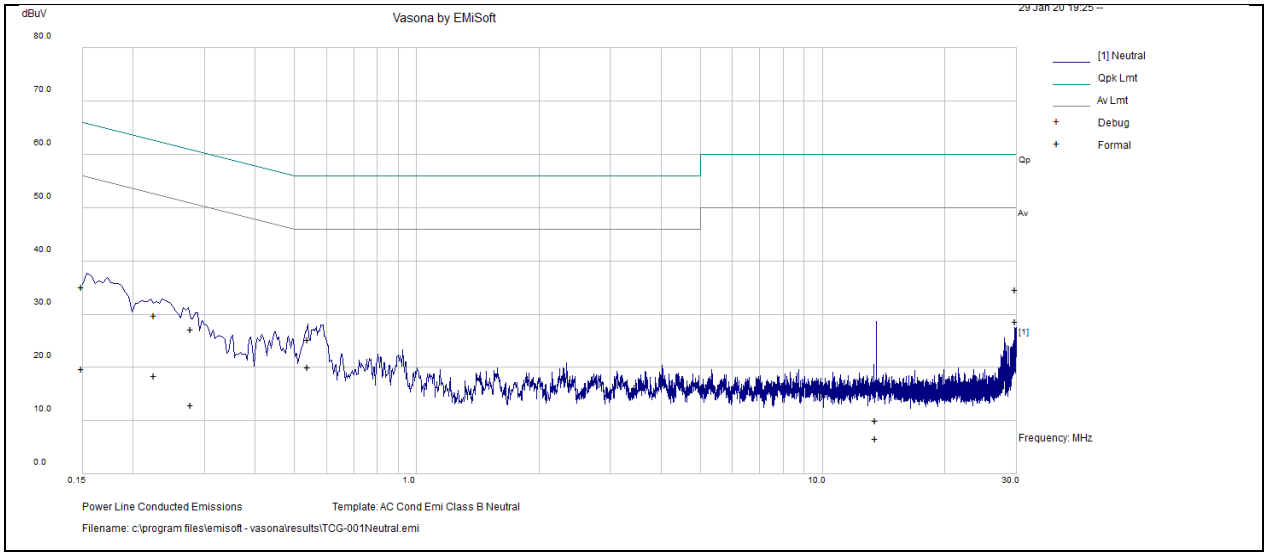


Phase	Neutral (N)	Detector Function	Quasi-Peak / Average

No	Frequency (MHz)	Reading Value (dBuV)	Cable Loss (dB)	Insertion Loss (dB)	Emission Level Corrected (dBuV)	Measurement Type	Line/ Neutral	Limit (dBuV)	Margin (dB)	Pass/ Fail
1	0.541467	15.81	9.45	0.03	25.3	Quasi Peak	Neutral	56	-30.7	Pass
2	0.15	25.82	9.29	0.03	35.15	Quasi Peak	Neutral	66	-30.85	Pass
3	0.225727	20.26	9.4	0.03	29.69	Quasi Peak	Neutral	62.61	-32.91	Pass
4	13.567389	-0.01	9.68	0.3	9.97	Quasi Peak	Neutral	60	-50.03	Pass
5	0.278634	17.7	9.44	0.03	27.16	Quasi Peak	Neutral	60.86	-33.69	Pass
6	30	23.87	9.95	0.78	34.6	Quasi Peak	Neutral	60	-25.4	Pass
7	0.541467	10.57	9.45	0.03	20.06	Average	Neutral	46	-25.94	Pass
8	0.15	10.4	9.29	0.03	19.72	Average	Neutral	56	-36.28	Pass
9	0.225727	8.94	9.4	0.03	18.38	Average	Neutral	52.61	-34.23	Pass
10	13.567389	-3.31	9.68	0.3	6.67	Average	Neutral	50	-43.33	Pass
11	0.278634	3.41	9.44	0.03	12.88	Average	Neutral	50.86	-37.98	Pass
12	30	17.85	9.95	0.78	28.58	Average	Neutral	50	-21.42	Pass

REMARKS:

1. The emission levels of other frequencies were very low against the limit.
2. Margin value = Emission level - Limit value
3. Emission Level = Correction Factor + Raw Value + Factors Value.

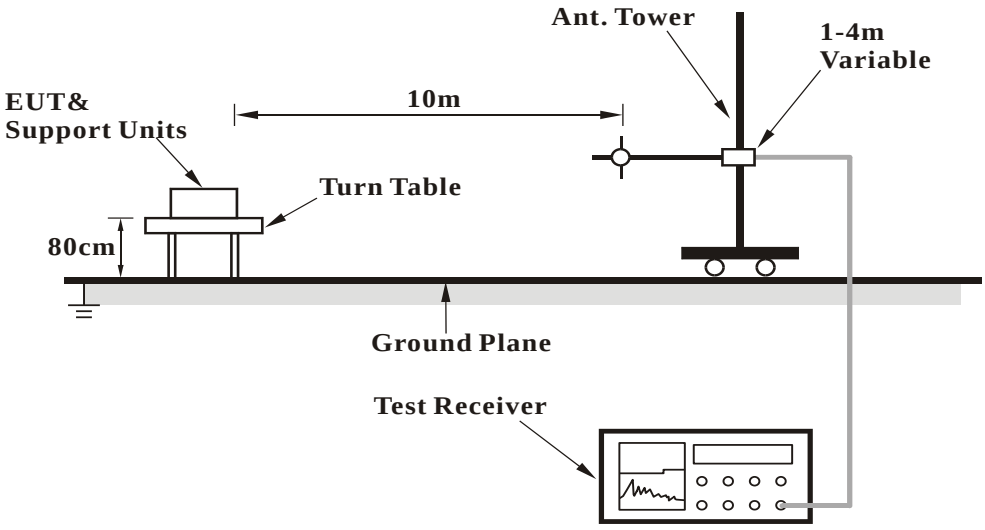


4.3 20dB & 99% Channel Bandwidth

4.3.1 Limits of Emission Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

4.3.2 Test Setup



4.3.3 Test Procedure

i. Turn on the EUT and set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

ii. Connect a dipole antenna to the measurement instrument. Make sure waveform is received by test antenna which is connected to the spectrum analyzer. Plot the 20 dB bandwidth

4.3.4 Deviation from Test Standard

No Deviation.

4.3.5 EUT Operating Condition

Same as 4.2.6

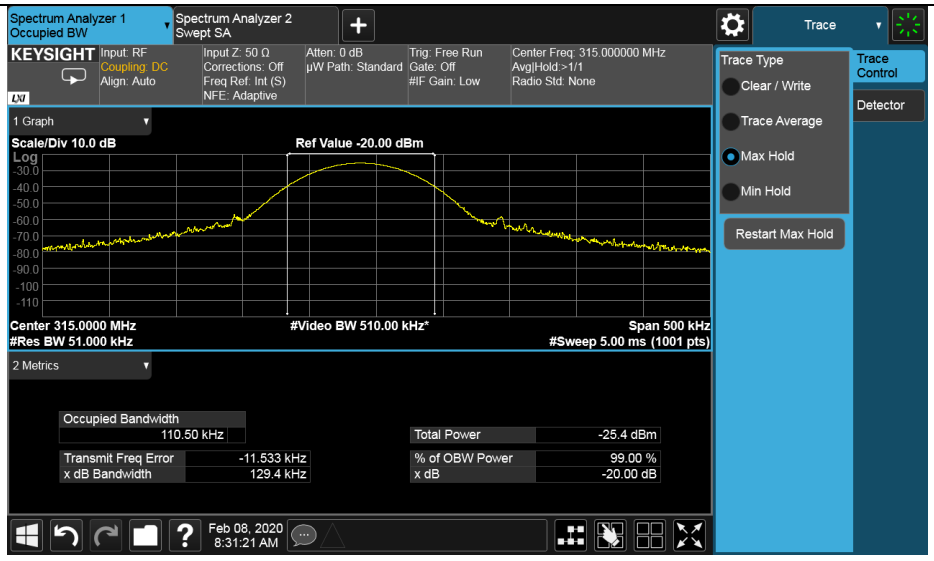
4.3.6 Test Results

Channel	Frequency(MHz)	20 dB Bandwidth(kHz)	99% OBW(kHz)	Limit(kHz)	Results
1	310	129.1	110.63	787.5	Pass
2	315	129.4	110.50	787.5	Pass
3	350	128.7	110.7	787.5	Pass

Note: Limit = 0.25% * 315 MHz = 787.5 kHz

Test Plots:

310 MHz



315 MHz

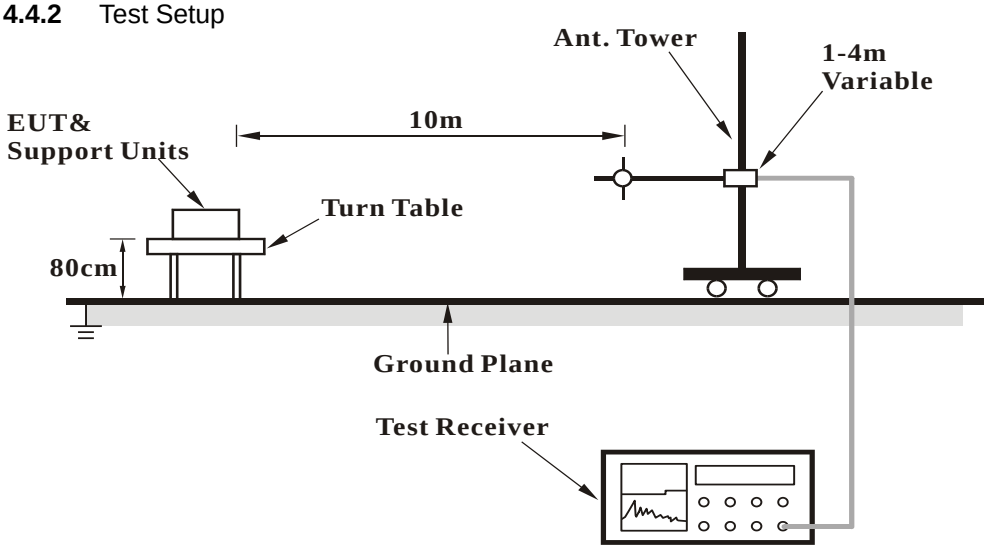
350 MHz

4.4 TIMING REQUIREMENT

4.4.1 Limits of Timing Requirement

Per FCC §15.231(a) (1) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

4.4.2 Test Setup



4.4.3 Test Procedure

1. With the EUT's antenna attached, the waveform was received by the test antenna which was connected to the spectrum analyzer.
2. Set center frequency of spectrum analyzer=operating frequency.
3. Set the spectrum analyzer as RBW=100k VBW=300k Span=0Hz.
4. Repeat above procedures until all frequency measured was complete.

4.4.4 Deviation from Test Standard

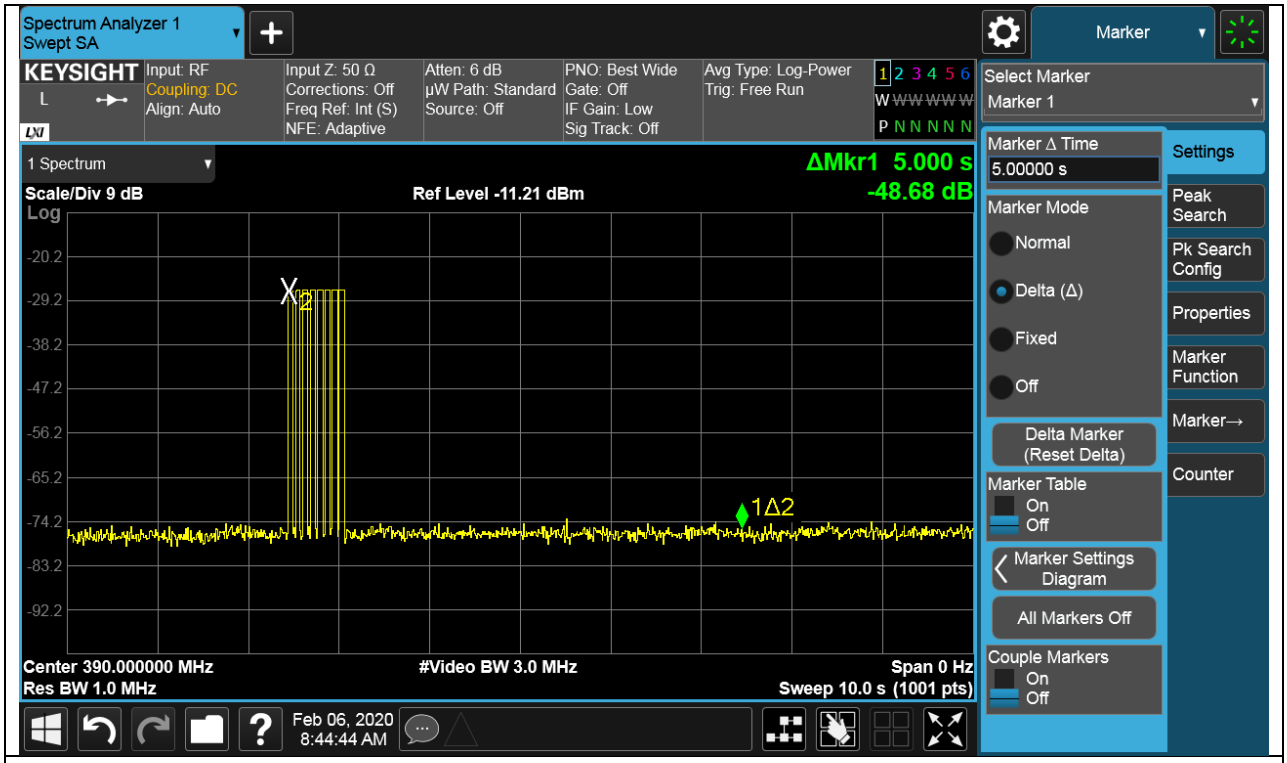
No Deviation.

4.4.5 EUT Operating Condition

Same as 4.1.6

4.4.6 Test Results

Test Plot



Stop transmit time < 5 seconds

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

Bureau Veritas is a global leader in testing, inspection and certification (TIC) services. We help businesses improve safety, sustainability and productivity; and our clients include the majority of leading brands in retail, manufacturing and other industries. With a presence in every major country around the world, our quality assurance and compliance solutions are vital in helping our customers enhance product quality and concept-to-consumer journeys. We also assist with increasing speed to market, profitability and brand equity throughout the supply chain. Bureau Veritas is a leading wireless/IoT testing, inspection, audit and certification provider, with a global network of test laboratories to support the IoT industry in areas of connectivity, security, interoperability as well as quality, health & safety, and environmental/chemical requirements.

If you have any comments, please feel free to contact us at the following:

Milpitas EMC/RF/Safety/Telecom Lab
775 Montague Expressway, Milpitas, CA 95035
Tel: +1 408 526 1188

Sunnyvale OTA/Bluetooth Lab
1293 Anvilwood Avenue, Sunnyvale, CA 94089
Tel: +1 669 600 5293

Littleton EMC/RF/Safety/Environmental Lab
1 Distribution Center Cir #1, Littleton, MA 01460
Tel: +1 978 486 8880

Irvine OTA/PTCRB/Bluetooth/V2X Lab
15 Musick, Irvine, CA 92618
Tel: +1 949 716 6512

Email: sales.eaw@us.bureauveritas.com
Web Site: www.cpsusa-bureauveritas.com

The address and road map of all our labs can be found in our web site also.

--- END ---